CSE- 1006 LAB Assignment 2.2

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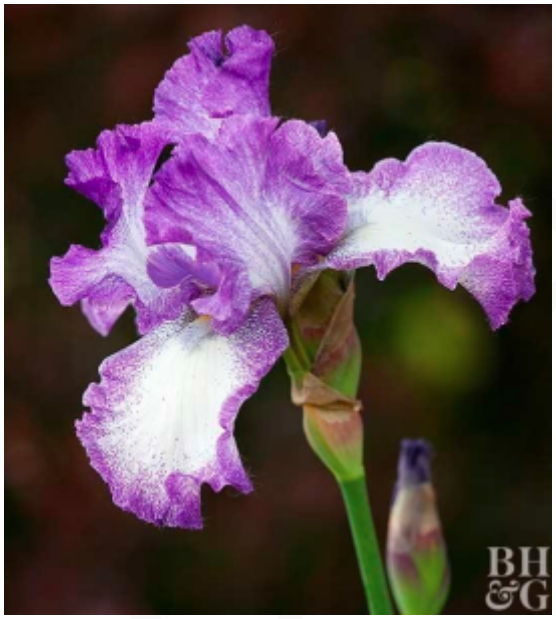
Faculty Name: Dr. Arun kumar Gopu **Date:** 17/3/2022

Student name: M.Taran **Reg. no.:** 19BCE7346

dFisher's Iris Dataset



Iris Flowers

Description

This famous (Fisher's or Anderson's) iris data set gives the measurements in centimetres of the variables sepal length and width and petal length and width, respectively, for 50 flowers from each of 3 species of iris. The species are Iris setosa, versicolor, and virginica.

Format

iris is a data frame with 150 cases (rows) and 5 variables (columns) named Sepal.Length, Sepal.Width, Petal.Length, Petal.Width, and Species

EXERCISES

· Print the dataset iris

```
> print(iris)
    Sepal.Length Sepal.Width Petal.Length
1            5.1         3.5          1.4
2            4.9         3.0          1.4
3            4.7         3.2          1.3
4            4.6         3.1          1.5
5            5.0         3.6          1.4
6            5.4         3.9          1.7
7            4.6         3.4          1.4
8            5.0         3.4          1.5
9            4.4         2.9          1.4
10           4.9         3.1          1.5
11           5.4         3.7          1.5
12           4.8         3.4          1.6
13           4.8         3.0          1.4
14           4.3         3.0          1.1
15           5.8         4.0          1.2
16           5.7         4.4          1.5
17           5.4         3.9          1.3
18           5.1         3.5          1.4
19           5.7         3.8          1.7
20           5.1         3.8          1.5
21           5.4         3.4          1.7
22           5.1         3.7          1.5
23           4.6         3.6          1.0
24           5.1         3.3          1.7
25           4.8         3.4          1.9
```

```
> iris
    Sepal.Length Sepal.Width Petal.Length
1            5.1         3.5          1.4
2            4.9         3.0          1.4
3            4.7         3.2          1.3
4            4.6         3.1          1.5
5            5.0         3.6          1.4
6            5.4         3.9          1.7
7            4.6         3.4          1.4
8            5.0         3.4          1.5
9            4.4         2.9          1.4
10           4.9         3.1          1.5
11           5.4         3.7          1.5
12           4.8         3.4          1.6
13           4.8         3.0          1.4
14           4.3         3.0          1.1
15           5.8         4.0          1.2
16           5.7         4.4          1.5
17           5.4         3.9          1.3
18           5.1         3.5          1.4
19           5.7         3.8          1.7
```

· Print the structure of the dataset iris

```
> str(iris)
'data.frame':   150 obs. of  5 variables:
 $ Sepal.Length: num  5.1 4.9 4.7 4.6 5 5.4 4.6
 5 4.4 4.9 ...
 $ Sepal.Width : num  3.5 3 3.2 3.1 3.6 3.9 3.4
 3.4 2.9 3.1 ...
 $ Petal.Length: num  1.4 1.4 1.3 1.5 1.4 1.7 1.
4 1.5 1.4 1.5 ...
 $ Petal.Width : num  0.2 0.2 0.2 0.2 0.2 0.4 0.
3 0.2 0.2 0.1 ...
 $ Species     : Factor w/ 3 levels "setosa","ve
rsicolor",..: 1 1 1 1 1 1 1 1 1 1 ...
>
```

· Print the summary of all the variables of the dataset iris (Hint: Use function summary())

```
> summary(iris)
  Sepal.Length    Sepal.Width
 Min.   :4.300   Min.   :2.000
 1st Qu.:5.100   1st Qu.:2.800
 Median :5.800   Median :3.000
 Mean   :5.843   Mean   :3.057
 3rd Qu.:6.400   3rd Qu.:3.300
 Max.   :7.900   Max.   :4.400
  Petal.Length    Petal.Width
 Min.   :1.000   Min.   :0.100
 1st Qu.:1.600   1st Qu.:0.300
 Median :4.350   Median :1.300
 Mean   :3.758   Mean   :1.199
 3rd Qu.:5.100   3rd Qu.:1.800
 Max.   :6.900   Max.   :2.500
       Species
 setosa    :50
 versicolor:50
 virginica :50
```

· How many of the variables (columns) are in the dataset iris

```
> ncol(iris)
[1] 5
```

· How many observations (rows) are in the dataset iris

```
> nrow(iris)
[1] 150
```

· Use duplicated() function to print the logical vector indicating the duplicate values present in the dataset iris

```
> duplicated(iris)
  [1] FALSE FALSE FALSE FALSE FALSE FALSE
  [7] FALSE FALSE FALSE FALSE FALSE FALSE
 [13] FALSE FALSE FALSE FALSE FALSE FALSE
 [19] FALSE FALSE FALSE FALSE FALSE FALSE
 [25] FALSE FALSE FALSE FALSE FALSE FALSE
 [31] FALSE FALSE FALSE FALSE FALSE FALSE
 [37] FALSE FALSE FALSE FALSE FALSE FALSE
 [43] FALSE FALSE FALSE FALSE FALSE FALSE
 [49] FALSE FALSE FALSE FALSE FALSE FALSE
 [55] FALSE FALSE FALSE FALSE FALSE FALSE
 [61] FALSE FALSE FALSE FALSE FALSE FALSE
 [67] FALSE FALSE FALSE FALSE FALSE FALSE
 [73] FALSE FALSE FALSE FALSE FALSE FALSE
 [79] FALSE FALSE FALSE FALSE FALSE FALSE
 [85] FALSE FALSE FALSE FALSE FALSE FALSE
 [91] FALSE FALSE FALSE FALSE FALSE FALSE
 [97] FALSE FALSE FALSE FALSE FALSE FALSE
[103] FALSE FALSE FALSE FALSE FALSE FALSE
```

· Extract duplicate elements from the dataset iris

```
> iris[duplicated(iris),]
    Sepal.Length Sepal.Width Petal.Length
143          5.8         2.7          5.1
    Petal.Width   Species
143         1.9 virginica
>
```

· Extract unique elements from the dataset iris

```
> iris[!duplicated(iris),]
    Sepal.Length Sepal.Width Petal.Length
1            5.1         3.5          1.4
2            4.9         3.0          1.4
3            4.7         3.2          1.3     Petal.Width    Species
4            4.6         3.1          1.5 1           0.2     setosa
5            5.0         3.6          1.4 2           0.2     setosa
6            5.4         3.9          1.7 3           0.2     setosa
7            4.6         3.4          1.4 4           0.2     setosa
8            5.0         3.4          1.5 5           0.2     setosa
9            4.4         2.9          1.4 6           0.4     setosa
10           4.9         3.1          1.5 7           0.3     setosa
11           5.4         3.7          1.5 8           0.2     setosa
12           4.8         3.4          1.6 9           0.2     setosa
13           4.8         3.0          1.4 10          0.1     setosa
14           4.3         3.0          1.1 11          0.2     setosa
15           5.8         4.0          1.2 12          0.2     setosa
16           5.7         4.4          1.5 13          0.1     setosa
17           5.4         3.9          1.3 14          0.1     setosa
18           5.1         3.5          1.4 15          0.2     setosa
19           5.7         3.8          1.7 16          0.4     setosa
20           5.1         3.8          1.5 17          0.4     setosa
21           5.4         3.4          1.7 18          0.3     setosa
22           5.1         3.7          1.5 19          0.3     setosa
23           4.6         3.6          1.0 20          0.3     setosa
```

· Print the indices of duplicate elements in the dataset iris

```
> which(duplicated(iris))
[1] 143
>
```

· Print the indices of unique elements in the dataset iris

```
> which(!duplicated(iris))
  [1]   1   2   3   4   5   6   7   8   9
 [10]  10  11  12  13  14  15  16  17  18
 [19]  19  20  21  22  23  24  25  26  27
 [28]  28  29  30  31  32  33  34  35  36
 [37]  37  38  39  40  41  42  43  44  45
 [46]  46  47  48  49  50  51  52  53  54
 [55]  55  56  57  58  59  60  61  62  63
 [64]  64  65  66  67  68  69  70  71  72
 [73]  73  74  75  76  77  78  79  80  81
 [82]  82  83  84  85  86  87  88  89  90
 [91]  91  92  93  94  95  96  97  98  99
[100] 100 101 102 103 104 105 106 107 108
[109] 109 110 111 112 113 114 115 116 117
[118] 118 119 120 121 122 123 124 125 126
[127] 127 128 129 130 131 132 133 134 135
[136] 136 137 138 139 140 141 142 144 145
[145] 146 147 148 149 150
```

· How many unique elements are in the dataset iris

```
> sum(!duplicated(iris))
[1] 149
```

· How many duplicate elements are in the dataset iris

```
> sum(duplicated(iris))
[1] 1
>
```

Missing Values:

· A missing value is one whose value is unknown.

· Missing values are represented in R by the NA symbol.

· NA is a special value whose properties are different from other values.

· NA is one of the very few reserved words in R: you cannot give anything this name.

· Missing values are often legitimate: values really are missing in real life.

· NAs can arise when you read in an Excel spreadsheet with empty cells, for example.

· You will also see NA when you try certain operations that are illegal or don't make sense.

Here are some examples of operations that produce NA's.

EXERCISES

· Practice above examples that generate NA values

```
> x <- c(12, 34, NA, 3, 4, NA, 56, NA,37,89,NA,43)
>
> is.na(x)
 [1] FALSE FALSE  TRUE FALSE FALSE  TRUE
 [7] FALSE  TRUE FALSE FALSE  TRUE FALSE
>
```

· Create NA values by some illegal operations

```
> as.numeric (c("2", "6", "three", "4"))
[1]  2  6 NA  4
Warning message:
NAs introduced by coercion
```

· Practice exercises in lecture slide

```
> x
 [1] 12 34 NA  3  4 NA 56 NA 37 89 NA 43
> x + 1
 [1] 13 35 NA  4  5 NA 57 NA 38 90 NA 44
>
> sum(x)
[1] NA
>
> length(x)
[1] 12
>
> is.na(x)
 [1] FALSE FALSE  TRUE FALSE FALSE  TRUE FALSE
 [8]  TRUE FALSE FALSE  TRUE FALSE
>
> which(is.na(x))
[1]  3  6  8 11
>
> x[! is.na(x)]
[1] 12 34  3  4 56 37 89 43
>
```

· What happens when we try to sort the data with NA values

Sorting data containing missing values in R is again different from other packages because NA cannot be compared to other values.

By default, sort removes any NA values and can therefore change the length of a vector.

```
> (temp <- sort(x))
[1]  3  4 12 34 37 43 56 89
>
```

· How to find the length of a vector with NA values

```
> length(temp)
[1] 8
```

The user can specify if NA should be last or first in a sorted order by indicating TRUE or FALSE for the na.last argument.

```
> sort(x, na.last = TRUE)
 [1]  3  4 12 34 37 43 56 89 NA NA NA NA
```

DATASET – INTRODUCTION

In today's lab we are going to work on dataset "airquality"

Details of Dataset:

Daily readings of the following air quality values for May 1, 1973 (a Tuesday) to September 30, 1973.

Description of variables:

Ozone: Mean ozone in parts per billion from 1300 to 1500 hours at Roosevelt Island

Solar.R: Solar radiation in Langleys in the frequency band 4000--7700 Angstroms from 0800 to 1200 hours at Central Park

Wind: Average wind speed in miles per hour at 0700 and 1000 hours at LaGuardia Airport

Temp: Maximum daily temperature in degrees Fahrenheit at LaGuardia Airport.

EXERCISES

· Print the dataset airquality

```
> airquality
    Ozone Solar.R Wind Temp Month Day
1      41     190  7.4   67     5   1
2      36     118  8.0   72     5   2
3      12     149 12.6   74     5   3
4      18     313 11.5   62     5   4
5      NA      NA 14.3   56     5   5
6      28      NA 14.9   66     5   6
7      23     299  8.6   65     5   7
8      19      99 13.8   59     5   8
9       8      19 20.1   61     5   9
10     NA     194  8.6   69     5  10
11      7      NA  6.9   74     5  11
12     16     256  9.7   69     5  12
13     11     290  9.2   66     5  13
14     14     274 10.9   68     5  14
15     18      65 13.2   58     5  15
16     14     334 11.5   64     5  16
17     34     307 12.0   66     5  17
18      6      78 18.4   57     5  18
19     30     322 11.5   68     5  19
20     11      44  9.7   62     5  20
21      1       8  9.7   59     5  21
22     11     320 16.6   73     5  22
23      4      25  9.7   61     5  23
24     32      92 12.0   61     5  24
25     NA      66 16.6   57     5  25
132    21     230 10.9   75     9   9
133    24     259  9.7   73     9  10
134    44     236 14.9   81     9  11
135    21     259 15.5   76     9  12
136    28     238  6.3   77     9  13
137     9      24 10.9   71     9  14
138    13     112 11.5   71     9  15
139    46     237  6.9   78     9  16
140    18     224 13.8   67     9  17
141    13      27 10.3   76     9  18
142    24     238 10.3   68     9  19
143    16     201  8.0   82     9  20
144    13     238 12.6   64     9  21
145    23      14  9.2   71     9  22
146    36     139 10.3   81     9  23
147     7      49 10.3   69     9  24
148    14      20 16.6   63     9  25
149    30     193  6.9   70     9  26
150    NA     145 13.2   77     9  27
151    14     191 14.3   75     9  28
152    18     131  8.0   76     9  29
153    20     223 11.5   68     9  30
```

· Print the structure of the dataset airquality

```
> str(airquality)
'data.frame':   153 obs. of  6 variables:
 $ Ozone  : int  41 36 12 18 NA 28 23 19 8 NA
 ...
 $ Solar.R: int  190 118 149 313 NA NA 299 99
 19 194 ...
 $ Wind   : num  7.4 8 12.6 11.5 14.3 14.9 8.6
 13.8 20.1 8.6 ...
 $ Temp   : int  67 72 74 62 56 66 65 59 61 69
 ...
 $ Month  : int  5 5 5 5 5 5 5 5 5 5 ...
 $ Day    : int  1 2 3 4 5 6 7 8 9 10 ...
>
```

· Print the summary of all the variables of the dataset airquality (Hint: Use function summary())

```
> summary(airquality)
     Ozone           Solar.R
 Min.   :  1.00   Min.   :  7.0
 1st Qu.: 18.00   1st Qu.:115.8
 Median : 31.50   Median :205.0
 Mean   : 42.13   Mean   :185.9
 3rd Qu.: 63.25   3rd Qu.:258.8
 Max.   :168.00   Max.   :334.0
 NA's   :37       NA's   :7
      Wind             Temp
 Min.   : 1.700   Min.   :56.00
 1st Qu.: 7.400   1st Qu.:72.00
 Median : 9.700   Median :79.00
 Mean   : 9.958   Mean   :77.88
 3rd Qu.:11.500   3rd Qu.:85.00
 Max.   :20.700   Max.   :97.00

     Month            Day
 Min.   :5.000   Min.   : 1.0
 1st Qu.:6.000   1st Qu.: 8.0
 Median :7.000   Median :16.0
 Mean   :6.993   Mean   :15.8
 3rd Qu.:8.000   3rd Qu.:23.0
 Max.   :9.000   Max.   :31.0
```

· How many of the variables (columns) are in the dataset airquality

```
> ncol(airquality)
[1] 6
```

· How many observations (rows) are in the dataset airquality

```
> nrow(airquality)
[1] 153
```

· Use the function is.na() to find whether any missing values are in the dataset airquality

```
> is.na(airquality)
       Ozone Solar.R  Wind  Temp Month
  [1,] FALSE   FALSE FALSE FALSE FALSE
  [2,] FALSE   FALSE FALSE FALSE FALSE
  [3,] FALSE   FALSE FALSE FALSE FALSE
  [4,] FALSE   FALSE FALSE FALSE FALSE
  [5,]  TRUE    TRUE FALSE FALSE FALSE
  [6,] FALSE    TRUE FALSE FALSE FALSE
  [7,] FALSE   FALSE FALSE FALSE FALSE
  [8,] FALSE   FALSE FALSE FALSE FALSE
  [9,] FALSE   FALSE FALSE FALSE FALSE
 [10,]  TRUE   FALSE FALSE FALSE FALSE
 [11,] FALSE    TRUE FALSE FALSE FALSE
 [12,] FALSE   FALSE FALSE FALSE FALSE
 [13,] FALSE   FALSE FALSE FALSE FALSE
 [14,] FALSE   FALSE FALSE FALSE FALSE
 [15,] FALSE   FALSE FALSE FALSE FALSE
 [16,] FALSE   FALSE FALSE FALSE FALSE
 [17,] FALSE   FALSE FALSE FALSE FALSE
 [18,] FALSE   FALSE FALSE FALSE FALSE
 [19,] FALSE   FALSE FALSE FALSE FALSE
 [20,] FALSE   FALSE FALSE FALSE FALSE
 [21,] FALSE   FALSE FALSE FALSE FALSE
 [22,] FALSE   FALSE FALSE FALSE FALSE
 [23,] FALSE   FALSE FALSE FALSE FALSE
```

· Print the indices of the missing values in the dataset airquality in column major representation

```
> colSums(is.na(airquality))
  Ozone Solar.R    Wind    Temp   Month
     37       7       0       0       0
    Day
      0

> which(is.na(airquality))
 [1]   5  10  25  26  27  32  33  34  35  36
[11]  37  39  42  43  45  46  52  53  54  55
[21]  56  57  58  59  60  61  65  72  75  83
[31]  84 102 103 107 115 119 150 158 159 164
[41] 180 249 250 251
>
```

· Print the indices of the missing values in the dataset airquality in row major representation

```
> rowSums(is.na(airquality))
  [1] 0 0 0 0 2 1 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0
 [22] 0 0 0 1 1 2 0 0 0 0 1 1 1 1 1 1 0 1 0 0 1
 [43] 1 0 1 1 0 0 0 0 0 1 1 1 1 1 1 1 1 1 0 0
 [64] 0 1 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 1 1
 [85] 0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 0 0 1 1 0 0
[106] 0 1 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0
[127] 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
[148] 0 0 1 0 0 0
```

```
> which(is.na(airquality$Ozone))
  [1]   5  10  25  26  27  32  33  34  35  36
 [11]  37  39  42  43  45  46  52  53  54  55
 [21]  56  57  58  59  60  61  65  72  75  83
 [31]  84 102 103 107 115 119 150
```

· Print indices of the missing values in row and column number wise (Hint: Use function which() and argument arr.ind = TRUE)

```
> which(is.na(airquality),arr.ind = TRUE)
      row col
  [1,]   5   1
  [2,]  10   1
  [3,]  25   1
  [4,]  26   1
  [5,]  27   1
  [6,]  32   1
  [7,]  33   1
  [8,]  34   1
  [9,]  35   1
 [10,]  36   1
 [11,]  37   1
 [12,]  39   1
 [13,]  42   1
 [14,]  43   1
 [15,]  45   1
 [16,]  46   1
 [17,]  52   1
 [18,]  53   1
 [19,]  54   1
 [20,]  55   1
 [21,]  56   1
 [22,]  57   1
```

· How many missing values are in the dataset airquality?

```
> sum(is.na(airquality))
[1] 44
```

· Which variables are the missing values concentrated in?

```
> which(is.na(airquality))
  [1]   5  10  25  26  27  32  33  34  35  36
 [11]  37  39  42  43  45  46  52  53  54  55
 [21]  56  57  58  59  60  61  65  72  75  83
 [31]  84 102 103 107 115 119 150 158 159 164
 [41] 180 249 250 251
```

· How would you omit all rows containing missing values?

```
> na.omit(airquality)
    Ozone Solar.R Wind Temp Month Day
1      41     190  7.4   67     5   1
2      36     118  8.0   72     5   2
3      12     149 12.6   74     5   3
4      18     313 11.5   62     5   4
7      23     299  8.6   65     5   7
8      19      99 13.8   59     5   8
9       8      19 20.1   61     5   9
12     16     256  9.7   69     5  12
13     11     290  9.2   66     5  13
14     14     274 10.9   68     5  14
15     18      65 13.2   58     5  15
16     14     334 11.5   64     5  16
17     34     307 12.0   66     5  17
18      6      78 18.4   57     5  18
19     30     322 11.5   68     5  19
20     11      44  9.7   62     5  20
21      1       8  9.7   59     5  21
22     11     320 16.6   73     5  22
23      4      25  9.7   61     5  23
24     32      92 12.0   61     5  24
28     23      13 12.0   67     5  28
29     45     252 14.9   81     5  29
30    115     223  5.7   79     5  30
```

· Print the records without missing values in the dataset airquality using the function complete.cases()

```
> airquality[complete.cases(airquality),]
    Ozone Solar.R Wind Temp Month Day
1      41     190  7.4   67     5   1
2      36     118  8.0   72     5   2
3      12     149 12.6   74     5   3
4      18     313 11.5   62     5   4
7      23     299  8.6   65     5   7
8      19      99 13.8   59     5   8
9       8      19 20.1   61     5   9
12     16     256  9.7   69     5  12
13     11     290  9.2   66     5  13
14     14     274 10.9   68     5  14
15     18      65 13.2   58     5  15
16     14     334 11.5   64     5  16
17     34     307 12.0   66     5  17
18      6      78 18.4   57     5  18
19     30     322 11.5   68     5  19
20     11      44  9.7   62     5  20
21      1       8  9.7   59     5  21
```

· Print the records without missing values in the dataset airquality using the function na.omit()

```
> na.omit(airquality)
    Ozone Solar.R Wind Temp Month Day
1      41     190  7.4   67     5   1
2      36     118  8.0   72     5   2
3      12     149 12.6   74     5   3
4      18     313 11.5   62     5   4
7      23     299  8.6   65     5   7
8      19      99 13.8   59     5   8
9       8      19 20.1   61     5   9
12     16     256  9.7   69     5  12
13     11     290  9.2   66     5  13
14     14     274 10.9   68     5  14
15     18      65 13.2   58     5  15
16     14     334 11.5   64     5  16
17     34     307 12.0   66     5  17
18      6      78 18.4   57     5  18
19     30     322 11.5   68     5  19
20     11      44  9.7   62     5  20
21      1       8  9.7   59     5  21
22     11     320 16.6   73     5  22
23      4      25  9.7   61     5  23
24     32      92 12.0   61     5  24
```

· Print the records without missing values in the dataset airquality using the function na.exclude()

```
> na.exclude(airquality)
    Ozone Solar.R Wind Temp Month Day
1      41     190  7.4   67     5   1
2      36     118  8.0   72     5   2
3      12     149 12.6   74     5   3
4      18     313 11.5   62     5   4
7      23     299  8.6   65     5   7
8      19      99 13.8   59     5   8
9       8      19 20.1   61     5   9
12     16     256  9.7   69     5  12
13     11     290  9.2   66     5  13
14     14     274 10.9   68     5  14
15     18      65 13.2   58     5  15
16     14     334 11.5   64     5  16
17     34     307 12.0   66     5  17
18      6      78 18.4   57     5  18
19     30     322 11.5   68     5  19
20     11      44  9.7   62     5  20
21      1       8  9.7   59     5  21
22     11     320 16.6   73     5  22
23      4      25  9.7   61     5  23
24     32      92 12.0   61     5  24
28     23      13 12.0   67     5  28
```

· Print the records containing missing values in the dataset airquality using the function complete.cases()

```
> airquality[!complete.cases(airquality),]
    Ozone Solar.R Wind Temp Month Day
5      NA      NA 14.3   56     5   5
6      28      NA 14.9   66     5   6
10     NA     194  8.6   69     5  10
11      7      NA  6.9   74     5  11
25     NA      66 16.6   57     5  25
26     NA     266 14.9   58     5  26
27     NA      NA  8.0   57     5  27
32     NA     286  8.6   78     6   1
33     NA     287  9.7   74     6   2
34     NA     242 16.1   67     6   3
35     NA     186  9.2   84     6   4
36     NA     220  8.6   85     6   5
37     NA     264 14.3   79     6   6
39     NA     273  6.9   87     6   8
42     NA     259 10.9   93     6  11
43     NA     250  9.2   92     6  12
45     NA     332 13.8   80     6  14
46     NA     322 11.5   79     6  15
52     NA     150  6.3   77     6  21
53     NA      59  1.7   76     6  22
54     NA      91  4.6   76     6  23
55     NA     250  6.3   76     6  24
56     NA     135  8.0   75     6  25
57     NA     127  8.0   78     6  26
58     NA      47 10.3   73     6  27
59     NA      98 11.5   80     6  28
60     NA      31 14.9   77     6  29
61     NA     138  8.0   83     6  30
65     NA     101 10.9   84     7   4
72     NA     139  8.6   82     7  11
75     NA     291 14.9   91     7  14
83     NA     258  9.7   81     7  22
84     NA     295 11.5   82     7  23
96     78      NA  6.9   86     8   4
97     35      NA  7.4   85     8   5
98     66      NA  4.6   87     8   6
102    NA     222  8.6   92     8  10
103    NA     137 11.5   86     8  11
107    NA      64 11.5   79     8  15
115    NA     255 12.6   75     8  23
119    NA     153  5.7   88     8  27
150    NA     145 13.2   77     9  27
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